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Journal of International Economics 62 (2004) 83–106

Journal of INTERNATIONAL ECONOMICS

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Real GDP, real domestic income, and terms-of-trade changes ☆

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Received 12 December 2001; received in revised form 10 June 2003; accepted 7 July 2003

Abstract

Real GDP tends to underestimate the increase in real domestic income and welfare when the terms of trade improve. An improvement in the terms of trade is similar to a technological progress, but when computing real GDP, the national accounts treat the former as a price phenomenon and the latter as a real event. Calculations for 26 countries show that the divergence can add up to more than 10% of GDP in less than two decades. Our analysis has a solid theoretical foundation, being based on the GNP/GDP function approach to modeling the production sector of an open economy.

Keywords: Real GDP; GDP deflator; Terms of trade; Real income; Economic growth

JEL classification: O11; O41; C43; F11

1. Introduction

The economic performance of Switzerland over the long run is paradoxical. In most international comparisons, Switzerland is found to have a growth rate that is significantly lower than that of other industrialized nations. And yet, in terms of average living standards, Switzerland always ranks among the top nations. How can Switzerland go slower than everybody else, and nonetheless stay ahead?

☆ Earlier versions of this paper were presented at the Economic Measurement Group (EMG) Workshop, University of New South Wales, Sydney, at the Hong Kong University of Science and Technology, and at the 2003 annual meetings of the Canadian Economics Association, Ottawa.

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URL: http://www.unige.ch/ses/ecopo/kohli/kohli.html.

0022-1996/$ - see front matter
doi:10.1016/j.jinteco.2003.07.002

For the period 1980–1996, for instance, Switzerland, with an average real GDP growth rate of 1.3%, occupies the last position in a sample of 26 OECD countries. One could of course argue that this is a sign of convergence. If Switzerland has a relatively high living standard initially, it is perfectly possible that it grows less rapidly than its neighbors, and nevertheless that it maintain its lead position for a while yet. Sooner or later, though, it will be caught up. It turns out, however, that the Swiss growth paradox is not new. According to Dewald's (2002) data that span the period 1880–1995, Switzerland occupies the second-last position in a sample of 12 countries in terms of per-capita real growth. Knowing that 19th century Switzerland was a poor country in European comparison, how can one explain that it is today one of the countries where real income is highest?

The answer to this puzzle has to do, at least partially, with the improvements in the terms of trade that Switzerland has enjoyed over time. From 1980 to 1996, for instance, Switzerland's terms of trade have improved by a stunning 34%. In many ways, an improvement in the terms of trade is similar to a technological progress. It means that, for a given trade-balance position, the country can either import more for what it exports, or export less for what it imports. Put simply, it makes it possible to get more for less. An improvement in the terms of trade unambiguously increases real income and welfare. Yet, unlike a technological progress, the beneficial effect of an improvement in the terms of trade is not captured by real GDP, which focuses on production per se. In fact, if real GDP is measured by a Laspeyres quantity index, as it is still the case in most countries, an improvement in the terms of trade will actually lead to a *fall* in real GDP.

Real GDP is often used as a proxy of a country's real income, even though official statisticians warn against such a practice.[1] Thus, Prescott (2002), who singles out Switzerland for its poor economic performance over the past three decades, focuses exclusively on real GDP. We argue in this paper that real GDP can be a very misleading indicator of a country's welfare in the face of changing terms of trade. It is therefore important to distinguish between real GDP, on one hand, and real domestic income, on the other. Real GDP focuses on production possibilities, whereas real income stresses consumption (or more generally absorption) possibilities and, ultimately, welfare.[2] We show that real GDP systematically underestimates growth in real income when the terms of trade improve. The distinction between real GDP and real income implies differences between the corresponding price indexes. The implicit GDP price deflator, which is obtained by dividing nominal GDP by real GDP, will point at higher inflation than the income price deflator when the terms of trade improve. In fact, it turns out that a drop in the price of imports, holding all other prices constant, leads to an *increase* in the GDP price deflator.

[1] See United Nations (2002), Section 16.K, for instance.

[2] Real income and welfare are clearly very different concepts, but the fact remains that an increase in real income will, other things equal, allow for an increase in welfare.